

Inflation Convergence and the Choice of Exchange Rate Regime in East Asia

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Abstracts

In this paper, the feasibility of pegged regime, such as BBC, in East Asia is examined by the criteria of inflation convergence. In addition, the possible grouping of common peg is analyzed. Examining the inflation convergence, the stationary and cointegration techniques are applied. In the stationary test, it is found that there is less evidence of convergence among East Asian countries after the crisis. In the results of cointegration test, the evidences indicate that there is no shared common trend between most of East Asian countries and several shared common trend for the groups among China, Korea, Japan and ASEAN countries. That is weak convergence of inflation in these groups. This implies that currently the pegged regime might not be feasible in East Asia.

Keyword : Convergence, Pegged Exchange Rate Regime, East Asia

I . Introduction

It is argued that greater exchange rate volatility and misaligned exchange rates are related to the vulnerability of current floating exchange rate regime. Dissatisfaction of current floatings reflects the development of the basket peg exchange rate regime such as BBC

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(Basket, Band and Crawl). BBC regime is argued to limit the volatility of exchange rate by the wide band and to realign the misaligned exchange rate by the frequent change of the parity.

However, pegged regime could be a crisis prone if the monetary and exchange rate policies are not set in a mutually consistent manner.¹⁾ In this case, the system will lose its credibility, and the cost of the regime would be greater. Moreover, it is also subject to the danger of contagion by capital flow.²⁾

Recently, East Asian countries had experienced currency crisis. After then, most of the countries in this region except Malaysia have chosen more flexible exchange rate system and liberalized short term capital flows. As a result, East Asian countries have been exposed to foreign shocks. Furthermore, trade integration within East Asia is deeper and there have been increased arguments on the formation of regional trade integration.

In the light of these considerations, there have been increased arguments on regional monetary arrangement in East Asia. Several alternatives have been proposed and discussed among government officials and economists. One of the most feasible proposals is BBC regime which is the common basket peg on U.S. dollar, euro and yen.

Until recently, the feasibility of the pegged regime have been tested by examining the country characteristics (openness etc.), the existence of asymmetric shocks, and the kind of various shocks, and the affirmative view has been found in East Asia in which the results indicate East Asian countries satisfy most of the criteria of optimal currency area.

However, Willett (2003) and Eichengreen and Bayoumi (1999) have argued that without the consistent domestic macroeconomic and exchange rate policies, the system would lose the credibility.³⁾

1) Willett (2003).

2) In the light of this argument, the choice of currency regime is at the core of the research agenda.

Furthermore, the economic convergence should be important criteria in the choice of the pegged regime. Exchange rate could be unstable when the fundamentals diverge within the region. In fact, East Asian countries have lacked the consistency of macroeconomic policy and coordination of the exchange rate policy within the region.⁴⁾ The policy inconsistency results the divergence of macroeconomic fundamentals in East Asia.

In this paper, the feasibility of pegged regime in East Asia is examined by the criteria of economic convergence. In addition, the feasibility of the dollar peg, yen peg in East Asian countries and common basket peg among Asian countries are analyzed through the inflation convergence.

In order to test whether the convergence has been stronger after the Asian crisis in 1997, the period is divided by the two sub-periods, January 1990-November 1997 and December 1998-December 2002. Estimating the degree of the convergence, the stationary and cointegration techniques are used.

The paper is organized as follows. The following section considers the literature of East Asian monetary cooperation and the macroeconomic convergence and econometric methodology. Section III describes the data and then reports the results based on stationarity and cointegration tests. Section IV concludes.

3) Willett also argues that in developing countries, the operation of political process create a bias toward expansionary policy.

4) Furthermore, the countries have divergent economic development stage, and little desire of political cooperation. In this case, politicians could concern domestic objectives such as high unemployment rate, economic growth and export promotion etc., and the countries have more possibilities to lose the policy consistency.

II. Economic Convergence and Pegged Regime

1. Monetary Cooperation in East Asia

After the crisis in 1997, Asian countries realized that in order to solve the liquidity problem and assist in bringing stability to Asian currencies and financial markets, they need the establishment of regional fund. Japan came forward with a plan for an Asian Monetary Fund (AMF), in which it planned to raise \$50~60 billion in contribution from participating countries and another \$50 billion from Japanese Government. However, the plan was abolished a few months later. It was argued that AMF will increase the moral hazard problem and create a double standard.

Instead of the AMF, Manila Framework group (MFG) which is the meeting of finance and central bank from Asian-pacific region and high level representatives of IMF, ADB and IBRD established in November 1997. This framework discusses the regional surveillance, economic cooperation for the stability of financial system and cooperative financing arrangement. In October 1998, Japan proposed the bilateral support mechanism in which the \$30 billion is funded for the Asian countries in overcoming their economic crisis. In 2001, The Chiang Mai Initiative (CMI) was established by the Finance Ministers of ASEAN+3(Korea, Japan and China) at Chiang Mai in Thailand. CMI is bilateral swap arrangement (BSA) provided for some degree of collective defense against speculative arrangement.

In June 2003, Asia-pacific economies attempted to set up a \$1billion fund in a joint bid to promote bond markets in the region and channel official reserves of Asian economies back to the region. The Executives' Meeting of East Asia and Pacific Central Banks (EMEAP) economies establish the Asian Bond Fund (ABF) which is invested in a basket of U.S. dollar dominated bonds issued by the EMEAP's

sovereign issuer.⁵⁾

On the regional exchange arrangement, two alternatives have been proposed. The First one is pegging to a common basket suggested by Japanese officials⁶⁾ and Williamson (2000).⁷⁾ However, in the composition of currency basket, there has been several versions. Williamson advocated common peg system with equal weight of dollar, yen and euro. The other is to include most of East Asian countries' currencies in the basket. Common dollar peg and yen peg are suggested as alternatives.

The second proposal is to maintain the flexible exchange rate system with macroeconomic policy coordination within the region. Willett (2003) suggests the consistent macroeconomic policy and coordination of regional monetary and exchange rate policies could stabilize the exchange rate. Eichengreen and Bayoumi (1999) also suggested that Williamson's basket system could not be sustainable without policy coordination among the participating countries.⁸⁾

2. Analysis of Macroeconomic Convergence

Theoretical background of pegged regime choice is based on the theory of optimum currency area (OCA). OCA suggests the cost and benefit of common fixed exchange rate and also describes various criteria of OCA to maximize the benefit.

The feasibility of pegged regime could be examined by testing the

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- 5) Japan prefers the soft basket peg system (BBC) in which basket consists of the dollar, yen and euro, and East Asian countries stabilize loosely their exchange rate against the baskets.
 - 6) Williamson (2000) argues the reference rate system in which he does not insist the common hard peg. In this system, the authorities could use flexible intervention policy when the exchange rate approach the margin.
 - 7) The next step of financial cooperation in East Asia would be the establishment of institution body for the decision making and monitoring and surveillance unit.
 - 8) Basket system is a kind of intermediate regime which include wide range of regime between the hard peg to floatings.

country characteristics such as openness and trade integration within the region. As intra-regional trade increases, the region seems to be a better OCA. In addition, the various kinds of shocks and dominance of the symmetric or asymmetric shocks are the other criteria of OCA.⁹⁾ Alternative approach is to examine the economic convergence among the member countries. Divergent macroeconomic fundamentals result volatile and misaligned exchange rate and finally the pegged system could not be sustained.

One way to examine the convergence is to measure the variance of fundamentals within a member country and region, and compare with those of other regions. If there exist smaller standard deviation among countries of the region, it could meet the OCA criteria and pegged regime could be sustained.

The other way to test the economic convergence is to analyze the stationarity and cointegration relationship with credible benchmark country.¹⁰⁾ A finding of strong convergence in monetary policy with benchmark country implies that member countries have converged to one common monetary policy. In this case, the group of countries or the region could establish the common pegged regime. Also, cointegration technique is applied to test for a single common trend among the variables, where convergence is confirmed through the presence of r cointegrating vector among countries.

To test for cointegration consider a p -dimensional vector autoregression :

$$X_t = \alpha_1 X_{t-1} + \dots + \alpha_k X_{t-k} + e_t \quad (1)$$

where X_t is a sequence of random vectors with components $(x_{1t}, \dots,$

9) In the case of the asymmetric shock is dominated, the adjustment cost of unemployment could be increased and the case is against OCA.

10) The period of 1979~1998 is EMS period, however, since 1992, the EU member countries tried to satisfy the convergence criteria by the Maastricht treaty.

x_{pt}) and $t = 1, \dots, T$. The innovations to this process, the e 's are drawn from a p -dimensional *i.i.d.*

The test procedure examines the $p \times p$ matrix. When $0 < \text{rank}(\Pi) = r < p$, there are r cointegrating relations among the elements of X_t and $p - r$ common stochastic trends. Johansen and Juselius (1990) provide two tests for the rank of Π : the trace test and maximum eigenvalue test. The both tests are employed in this study. In the trace test, the null hypothesis that there are at most r cointegrating vectors is tested against the general alternative. In the maximum eigenvalue test, the null hypothesis of r cointegrating vectors is tested against the alternative of at least $r + 1$ cointegrating vectors.

A necessary condition for multi-country policy convergence is that there are $p - 1$ cointegrating vectors among p policy measures; that is r should be equal to $p - 1$. This fact implies that there is only one common policy trend shared by all countries and there is a complete long run convergence of policies. When less than $p - 1$ but at least one cointegrating vector is found, it implies that there is partial convergence of policies. It means that there is more than one common trend. If the number of cointegrating vector is zero, this indicates that there exist several (p) common trends, but no shared common trends and suggests no long run convergence of policies.

With respect to the feasibility of pegged regime in East Asia, Eichengreen and Bayoumi (1999) find the magnitude of supply shock is similar to those of EU whereas the demand shock is smaller than EU. In addition, they also find that the shock is more symmetric than those of EU. Kawai and Takagi (2000) shows that the intra-regional trade during 1990~1998 is 47% of total trade. It means that about half of international trade in East Asia is conducted with in the region. Bayoumi, Eichengreen and Mauro (2000) also presents that the size of intra-industry trade is similar to the EU and the share of

intra-industry trade in GDP is higher than the NAFTA.

However, Park (2002) states that the intra-regional flow of capital has been smaller than inter-regional flows between East Asia on one hand and the U.S. and Europe on the other, even though the statistics are not available. That means East Asian countries have less strong financial link with the neighboring countries within the region. On the convergence of fundamentals, several studies have analyzed in the case of EU. Koedijk and Kool (1992) investigated nominal interest rate and inflation behavior in the EMS between March 1979 and September 1989, and found a persistent deviating movement in inflation and interest rate. Hafer and Kutan (1992) examined the convergence of EMS members' policies using a cointegration framework, and found that monetary policy convergence has not occurred for the period of march 1979 through December 1990. Westbrook (1998) examined whether the EMS failed to expedite convergence, and found that inflation rates had converged. However, less studies has been found in the case of East Asia.

III. Data and Empirical Results

1. Data

In order to compare the convergence of fundamentals in 8 Asian countries, the standard deviations of East Asia are compared with those of EU countries.¹¹⁾ The data used are annual data for the period of 1979~2000, and the sample is divided into two sub-periods, pre-Masstricht treaty and post-Masstricht treaty periods.

For estimation of the inflation convergence, the monthly data are

11) During this period, U.K and Italy abandoned their membership of ERM, and after then European countries attempted to stabilize their exchange rate, however they failed.

used for January 1990~December 2002. In the stationary test, the benchmark deviation of inflation is calculated with respect to the U.S. and other East Asian countries. The Sample period is divided according to the pre and after the foreign exchange crisis, January 1990~November 1997 and December 1998~December 2002.

All the data are obtained from the International Financial Statistics database and inflation data is expressed in the year over year growth of the CPI.

2. Empirical Results

During the period of EMS, EC countries had experienced unstable exchange rates. Based on these experiences, they had realized that exchange rate is endogenous variables, and the macroeconomic convergence criteria are necessary to maintain for the sustainable currency union and agreed the Masstricht Treaty.

According to the Masstricht treaty's economic convergence criteria, EU member countries should have sustainable price performance and an average rate of inflation that doesn't exceed by more than 1.5% the average of the three best performing member countries. In addition, they should satisfy the other macroeconomic convergence criteria, such as interest rate, budget deficit, and government debt etc. During 1992~1998, most of the EU member countries attempted to meet these convergence criteria and finally could join in EMU.

In East Asia, whatever alternatives will be the regional currency regime, East Asian authorities could earn the valuable policy implications from the EU's experience, in which, in order to maintain the stable exchange rate, member countries should prepare the macroeconomic convergence by macroeconomic and exchange rate policy cooperation.

In this section, the economic convergences are examined. First, the macroeconomic fundamentals' convergences are calculated by

estimating the average standard deviations of each countries and whole East Asian region, and are compared with those of EU.

Second, the inflation convergences are examined by examining the stationarity and cointegration relationship among each East Asian country. Furthermore, the inflation convergences investigate for a group of the sample countries, such as Japan, Korea and China. This enables us to assess the possibility of convergence group or common exchange rate regime.

1) Economic Convergence in East Asia

In <Table 1> and <Table 4>, the standard deviation of EU's major macroeconomic indicators in 1986 and 2003 are presented, and those of East Asia in 1996 and 2003 are reported in <Table 5> and <Table 7>. In <Table 1>, <Table 2> and <Table 3>, the average standard deviations of most of EU's economic indicators in 2000 are substantially decreased compared with in 1986, whereas there is less differences between those of 1996, 2000 and 2003 in the case of East Asia. When the magnitudes are compared in 2000 and 2003, the EU's indicators appear much lower than those of East Asia.

In addition, the period averages are also estimated for the two different sub-periods. The first period is before the Masstricht treaty (1979~1990) and the other periods are after the Masstricht treaty (1991~1998, 1999~2003). In the case of EU, <Table 8> shows that the standard deviation of GDP growth rate and inflation during 1991~1998 and 1999~2003 are substantially reduced compared with the period of pre-Masstricht treaty, 1979~1990. However, in the case of East Asia, <Table 9> indicates that the standard deviation of GDP growth rate is more increased in 1991~1998 than in 1979~1990, and the inflation is a little bit decreased during 1991~1998. When the magnitude is compared between two regions, most of the variables have higher standard deviations in East Asia than in EU.

In summary, EU's macroeconomic variables had been converged by

[Table 1] Main Economic Indicators of EU (1986) (unit: %)

1986	Inflation	Government bond yield	Government surplus or deficit /GDP	(export+ import) /GDP	GDP growth rate	Current account / GDP	Unemploy- ment rate
Belgium	1.3	7.93	-9.6	125.4	1.8	2.5	12.6
Denmark	3.7	9.91	...	66.2	4.0	-5.3	7.9
Germany	-0.1	5.92	-0.9	57.6	2.3	4.6	...
Greece	23.0	15.78	-9.4	46.5	1.6	-4.3	7.4
Spain	8.8	11.36	-4.7	37.5	3.2	1.7	21.2
France	2.5	8.44	-3.3	43.6	2.5	0.3	10.4
Ireland	3.8	11.07	-10.7	103.3	3.7	-3.2	18.1
Italy	5.8	1.52	-11.8	38.7	2.5	0.4	11.1
Luxemburg	0.3	8.67	6.5	...	...	...	1.5
Netherlands	0.1	6.32	-1.5	103.8	3.1	2.4	12
Austria	1.7	7.33	-5.8	71.8	2.3	0.2	5.2
Portugal	11.7	15.54	-10.7	59.5	4.1	3.4	8.3
Finland	2.9	...	0.1	52.6	2.5	-1.0	5.4
Sweden	4.2	10.26	-6.0	63	2.2	-1.0	2.2
U.K	3.4	9.86	-2.3	52.3	4.2	-0.2	11.8
Mean	4.87	9.27	-5.0	65.84	2.85	0.035	9.65
Standard Deviation	5.96	3.69	5.19	26.76	0.86	2.86	5.51

Data: Bank of Korea, Monthly Bulletin, IMF, IFS.

[Table 2] Main Economic Indicators of EU (1998) (unit: %)

1998	Inflation	Government bond yield	Government surplus or deficit /GDP	(export+ import) /GDP	GDP growth rate	Current account / GDP	Unemploy- ment rate
Belgium	1.0	4.72	-0.9	138.7	2.4	4.5	12.6
Denmark	1.9	4.59	...	70.7	2.8	-1.2	6.5
Germany	0.9	4.39	-2.1	56.7	2.2	-0.2	12.3
Greece	4.8	8.48	-5.9	33.5(97)	3.1	-4(97)	10.1
Spain	1.8	4.55	-2.6	58.2	3.8	-0.6	18.8
France	0.7	4.72	-2.7	50.5	3.5	2.8	11.8
Ireland	2.4	4.99	2.1	208.6	8.6	2.5	7.8
Italy	2.0	4.90	-2.8	49	1.8	1.7	12.3
Netherlands	2.0	4.87	-0.7	112.5	3.7	6.8	4.1
Austria	0.9	4.29	-2.3	90.9	3.3	-2.2	7.2
Portugal	2.8	4.09	-2.2	74.8	3.5	-6.8	5.0
Finland	1.4	4.72(99)	1.3	69.1	5.3	5.7	11.4
Sweden	-0.1	4.19(TB)	0.4	80.9	3.0	2.0	6.5
U.K	3.4	5.45	0.8	54.2	2.6	-0.1	4.7
Mean	1.79	4.94	-1.02	90.78	3.64	1.55	8.94
Standard Deviation	1.22	1.04	2.39	55.53	1.66	4.67	4.27

Note: Figures in parentheses denote the Treasury bill rate.

Data: Bank of Korea, Monthly Bulletin, IMF, IFS.

[Table 3] Main Economic Indicators of EU (2000) (unit : %)

2000	Inflation	Government bond yield	Government surplus or deficit /GDP	(export + import) /GDP	GDP growth rate	Current account / GDP	Unemployment rate
Belgium	2.5	5.58	-0.7(99)	150.3(99)	4.0	4.8	11.7(99)
Denmark	2.9	5.54	...	71.7(99)	2.9	2.1	5.3
Germany	1.9	5.24	1.3	57.9(99)	3.1	-1.0(99)	10.7
Greece	3.2	6.10	-5.0	...	4.1	...	...
Spain	3.4	5.36	0.3	56.2(99)	4.9	-2.1(99)	14.1
France	1.7	5.45	-1.3	50.5(99)	3.3	2.6	...
Ireland	5.6	...	4.5	...	...	...	...
Italy	2.5	5.58	-0.3	47.8(99)	2.9	0.7(99)	...
Netherlands	2.5	5.51	2.0	107.5(99)	3.8	5.7(99)	2.6
Austria	2.4	...	-1.1	91.5(99)	3.3	-2.7(99)	5.8
Portugal	2.9	...	-1.4	...	3.3	...	4.4(99)
Finland	3.4	5.48	6.7	67.2(99)	5.9	5.4	9.8
Sweden	1.0	3.95(TB)	6.1	89.5	4.6	2.9	4.7
U.K	2.9	4.68	0.05	56.3	3.1	-1.7	3.8
Mean	2.79	5.31	1.17	81.77	4.05	2.06	6.87
Standard Deviation	1.01	0.56	3.36	50.13	1.31	3.49	3.97

Note : Figures in parentheses denote the statistics of 1999.

Data : Bank of Korea, Monthly Bulletin, IMF, IFS

[Table 4] Main Economic Indicators of EU (2003) (unit : %)

2003	Inflation	Government bond yield	Government surplus or deficit /GDP	(export + import) /GDP	GDP growth rate	Current account / GDP	Unemployment rate
Belgium	1.6	4.2	-0.3	162.0	2.85	...	12.3
Denmark	2.1	3.5	...	57.1	2.77	2.6	5.7
Germany	1.0	3.8	...	56.2	0.89	2.0	11.7
Greece	...	...	...	...	...	...	...
Spain	3.0	3.5	-1.0	43.3	6.73	-2.5	8.8
France	2.1	4.2	...	41.7	1.98	0.2	n.a.
Ireland	3.5	...	...	95.5	5.31	-1.2	4.7
Italy	2.7	3.4	...	39.8	3.21	-1.3	8.7
Netherlands	2.1	4.2	-2.4	95.8	2.06	2.9	3.4
Austria	1.4	...	...	69.4	2.66	-0.8	7.0
Portugal	3.3	...	...	48.5	0.90	-4.6	6.3
Finland	0.86	4.14	0.02	57.98	2.59	5.13	10.59
Sweden	1.9	4.6	-1.9	60.8	3.90	6.7	4.9
U.K	2.9	4.2	...	38.1	5.34	-1.7	3.1
Mean	2.19	3.97	-1.12	66.63	3.22	0.62	7.27
Standard Deviation	0.85	0.40	1.03	34.31	1.81	3.30	3.14

Data : Bank of Korea, Monthly Bulletin, IMF, IFS

【Table 5】 Main Economic Indicators of East Asia (1996)

(unit: %)

1996	Inflation	Government bond yield	Government surplus or deficit /GDP	(export+ import) /GDP	GDP growth rate	Current account / GDP	Unemployment rate
Malaysia	3.49	8.89	0.7	180.2	10.0	-4.6	2.5
Singapore	1.38	6.26	14.7	327.7	7.5	15.2	3
Indonesia	7.97	19.21	1.2	51.1	7.8	-3.4	4.0
Japan	0.13	2.65	...	19.9	3.9	1.4	3.4
China	8.32	10.08	-0.7	39.7	9.6	0.9	3
Thailand	5.81	13.39	0.9	85.2	5.5	-8.1	1.1
Philippine	9.00	14.83	0.3	90.3	5.8	-4.8	9.5
Korea	4.92	8.84	0.1	63	6.8	-4.4	2
Mean	4.12	10.51	2.45	107.13	7.11	-7.8	3.56
Standard Deviation	3.28	5.18	5.43	101.4	2.06	7.24	2.55

Data : Bank of Korea, Monthly Bulletin, IMF, IFS

【Table 6】 Main Economic Indicators of East Asia (2000)

(unit: %)

2000	Inflation	Government bond yield	Government surplus or deficit /GDP	(export+ import) /GDP	GDP growth rate	Current account / GDP	Unemployment rate
Malaysia	1.53	6.76	-3.1	...	8.5	...	...
Singapore	1.36	5.83	11.3	341.3	9.9	23.6	...
Indonesia	3.72	18.45	-1.1	69.5(99)	4.8	4.1	...
Japan	-0.67	2.06	...	19.8(99)	0.5	2.5(99)	4.7(99)
China	0.25	5.85	-2.7	41.1(99)	8.0	1.9	...
Thailand	1.54	7.83	-2.3	124.3	4.4	7.5	...
Philippine	4.34	10.90	-4.1	104.3	4.0	12.2	...
Korea	2.26	8.5	-4.6	85.5(98)	8.8	12.8(99)	6.3
Mean	1.50	8.27	-0.94	112.25	6.01	9.22	5.5
Standard Deviation	1.65	4.83	5.52	107.1	3.19	7.70	1.13

Data : Bank of Korea, Monthly Bulletin, IMF, IFS

[Table 7] Main Economic Indicators of East Asia (2003)
(unit: %)

2003	Inflation	Government bond yield	Government Surplus or deficit /GDP	(export+ import) / GDP	GDP Growth rate	Current Account / GDP	Unemployment rate
Malaysia	1.06	6.3	n.a	175.76	8.7	7.58(02)	3.6
Singapore	0.5	5.31	6.55	160.14	0.68	30.13	5.4
Indonesia	5.1	16.94	n.a	44.38	10.93	3.57	n.a
Japan	-0.25	1.82	n.a	20.68	-0.09	2.93	5.3
China	1.2	5.31	-2.5	60.25	11.15	3.25	n.a
Thailand	1.8	5.94	0.4	79.09	9.31	5.31	2.2
Philippine	3	9.47	-4.65	71.31	8.59	4.33	11.4
Korea	3.6	6.2	n.a	61.61	5.42	2.04	3.4
Mean	2.12	7.16	-0.05	84.15	6.76	7.37	5.22
Standard Deviation	1.88	4.46	4.86	54.83	4.53	10.09	3.26

Data : Bank of Korea, Monthly Bulletin, IMF, IFS

[Table 8] Standard Deviation of Main Economic Indicators in EU
(unit: %)

	GDP growth rate			Inflation		
	1979~1990	1991~1998	1999~2003	1997~1990	1991~1998	1999~2003
Austria	1.63	1.00	1.07	1.84	1.12	0.83
Belgium	1.68	1.52	1.30	2.65	0.72	0.61
Finland	1.75	4.56	2.66	2.78	1.14	1.04
France	1.17	1.22	1.24	4.31	0.75	0.63
Germany	1.85	4.58	0.73	2.01	1.50	0.52
Ireland	1.96	3.37	4.13	6.57	0.70	1.54
Italy	1.46	1.14	0.96	5.68	1.51	0.44
Netherlands	1.96	1.03	2.57	2.48	0.52	1.02
Portugal	2.77	1.59	2.76	6.55	3.25	0.78
Spain	1.77	1.61	0.57	4.07	1.57	0.49
Denmark	1.86	1.46	1.22	3.32	0.32	0.30
Greece	1.76	1.56	...	3.69	5.19	...
Sweden	0.96	2.42	1.10	2.92	3.05	0.85
U.K	2.27	1.89	0.29	4.45	1.27	0.69
Mean	1.78	2.06	1.59	3.80	1.62	0.72

Data : Bank of Korea, Monthly Bulletin, IMF, IFS

【Table 9】 Standard Deviation of Main Economic Indicators in East Asia

(unit : %)

		Japan	China	Indonesia	Korea	Malaysia	Philippine	Singapore	Thailand	Mean
GDP Growth Rate	1979 ~ 1990	1.07	3.95	2.23	3.60	3.25	4.74	3.65	3.18	3.20
	1991 ~ 1998	2.14	2.37	7.14	5.12	5.94	2.68	3.94	6.79	4.51
	1999 ~ 2003	1.10	2.34	2.13	1.86	5.93	2.01	6.67	3.31	3.16
Inflation	1979 ~ 1990	2.06	7.13	4.04	8.71	2.77	12.13	2.97	5.45	5.64
	1991 ~ 1998	1.09	8.41	17.4	1.71	0.84	3.88	1.13	1.39	4.48
	1999 ~ 2003	0.28	1.02	5.64	1.27	0.64	1.73	0.71	0.68	1.5

Data : Bank of Korea, Monthly Bulletin, IMF, IFS

the Maastricht's treaty's convergence criteria. However, the East Asia has still very divergent macroeconomic fundamentals. This implies that the common pegged system in East Asia might not be feasible and sustainable without any macroeconomic policy cooperation.

2) Inflation Convergence in East Asia

In this section, the inflation convergences of both each country and several groups of Asian countries are examined by stationary and cointegration methodology. For the measure of the convergence deviation, the most credible country should be a benchmark country. In East Asia, the U.S. Japan, and other East Asian countries could be a benchmark country, whereas in EU, Germany could be a benchmark country. In addition, the possible convergence groups which has common currency regime are identified.

(1) Stationarity Test

The test results of bilateral inflation convergences of the U.S. and East Asian countries are summarized in <Table 10>. <Table 10> reports that the test statistics with the U.S., Japan and other East Asian countries as a benchmark country provide that at the 5% significance level there is no evidence of inflation convergence in all of the East Asian countries during the whole period. However, when the periods is divided by both pre and after the crisis periods, the results after the crisis point out the existence of more inflation

【Table 10】 ADF Test for the Inflation Difference

	U.S.	Japan	China	Korea	Singapore	Thailand	Malaysia	Philippine	Indonesia
U.S.	I	-2.16	-1.51	-2.75	-1.31	-1.55	-2.60	-2.08	-2.41
	II	-1.63	-2.25	-1.65	-2.35	-1.58	-2.55	-1.99	-3.26*
	III	-2.26	-3.71**	-1.84	-3.75**	-2.39	-1.95	-1.78	-3.33*
Jpn	I		-1.89	-3.43*	-2.56	-1.88	-3.29	-2.38	-2.87
	II		-2.03	-2.52	-2.09	-2.02	-2.25	-2.72	-1.46
	III		-1.63	-2.99*	-1.50	-2.27	-3.02*	-2.56	-3.45
Chi	I			-2.01	-1.59	-1.67	-1.59	-2.39	-2.02
	II			-2.79	-2.15	-1.58	-1.84	-1.36	-1.08
	III			-1.79	-3.62**	-2.69	-3.42*	-2.83	-3.31*
Kor	I				-2.39	-2.11	-2.65	-1.76	-2.64
	II				-2.82	-1.09	-2.62	-2.52	-2.76
	III				-2.13	-1.60	-2.06	-2.27	-2.02
Sing	I					-1.77	-2.39	-2.69	-2.35
	II					-2.07	-2.55	-2.74	-3.49*
	III					-2.41	-2.74	-1.45	-3.03*
Thai	I						-2.29	-2.23	-2.79
	II						-1.72	-2.36	-0.54
	III						-2.62	-2.70	-3.43*
Mal	I							-2.77	-1.98
	II							-2.39	-1.49
	III							-3.90**	-3.06*
Phil	I								-2.68
	II								-3.10
	III								-2.89*

Note: * (**) denotes rejection of the hypothesis at the 5%(1%) significance level. I: 1990. 1~2002. 12, II: 1990. 1~1997. 10, III: 1997. 11~2002. 12

convergence in East Asia by showing more stationary behavior. However, there is little evidence of inflation convergence for Korea/some of ASEAN countries and Japan/some of ASEAN countries even during the period after the crisis.

These results confirm that pegged regime which is the pegging against the other currency in East Asia might not be sustainable by pegging their currencies against the U.S. dollar, Japanese yen and other East Asian currencies during the study period.

(2) Cointegration Test

From <Table 11> to <Table 14>, the cointegration test results

[Table 11] Bilateral Johansen Cointegration Test (1)

	Period	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
U.S. /Korea	1990.1	None	0.056881	15.72	8.84
	~2002.12	At most 1	0.044526	6.88	6.88
	1990.1	None	0.079280	11.35	7.43
	~1997.10	At most 1	0.042551	3.91	3.91
	1997.11	None	0.139575	12.68	9.17
	~2002.12	At most 1	0.055984	3.51	3.51
U.S. /Japan	1990.1	None	0.063158	15.54	9.98
	~2002.12	At most 1	0.035647	5.55	5.55
	1990.1	None	0.067795	9.56	6.45
	~1997.10	At most 1	0.033169	3.10	3.10
	1997.11	None	0.158024	12.19	10.49
	~2002.12	At most 1	0.027501	1.70	1.70
U.S. /China	1990.1	None	0.041720	7.70	6.48
	~2002.12	At most 1	0.008030	1.23	1.23
	1990.1	None	0.053203	6.80	5.03
	~1997.10	At most 1	0.019089	1.77	1.77
	1997.11	None	0.311173	29.15**	22.73**
	~2002.12	At most 1	0.055984	6.41	6.41

Note : *(**) denotes rejection of the hypothesis at the 5%(1%) level.

[Table 12] Bilateral Johansen Cointegration Test (2)

	Period	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
Japan /Korea	1990.1	None	0.129762	25.99**	21.26**
	~2002.12	At most 1	0.030421	4.72	4.72
	1990.1	None	0.105952	12.74	10.30
	~1997.10	At most 1	0.026151	2.44	2.44
	1997.11	None	0.212721	22.26*	14.59
	~2002.12	At most 1	0.118266	7.68	7.68
Japan /China	1990.1	None	0.044403	8.54	6.90
	~2002.12	At most 1	0.010708	1.64	1.64
	1990.1	None	0.141440	16.13	14.03
	~1997.10	At most 1	0.026151	2.10	2.10
	1997.11	None	0.207542	17.12	13.96
	~2002.12	At most 1	0.051429	3.16	3.16
China /Korea	1990.1	None	0.161172	20.63*	10.72
	~2002.12	At most 1	0.149906	9.91*	9.91*
	1990.1	None	0.036034	6.74	5.58
	~1997.10	At most 1	0.007609	1.16	1.16
	1997.11	None	0.028248	4.01	2.64
	~2002.12	At most 1	0.014816	1.37	1.37

Note: *(**) denotes rejection of the hypothesis at the 5%(1%) level.

between bilateral countries are presented. The results indicate that the cointegration relationship is rejected for the U.S. & Korea, the U.S. & Japan and Japan and China. This indicates that there exist two common trends, but no shared common trends. It suggests no long run convergence of inflation between these countries.

However, it is found that there is evidence of cointegration between the U.S. & China, Korea & Japan and other some ASEAN countries such as Indonesia and Malaysia during the post-crisis period. This evidence implies that there is long run convergence of inflation and support the fact that the behavior of Korean won has been more

【Table 13】 Bilateral Johansen Cointegration Test (3)

	Period	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
Indonesia /Malaysia	1990.1	None	0.080012	16.33	12.76
	~2002.12	At most 1	0.023042	3.57	3.57
	1990.1	None	0.124210	19.05	12.07
	~1997.10	At most 1	0.073893	6.99	6.99
	1997.11	None	0.301226	25.89**	22.22**
	~2002.12	At most 1	0.057468	3.67	3.67
Indonesia /Philippine	1990.1	None	0.078708	19.67	12.54
	~2002.12	At most 1	0.045527	7.13	7.13
	1990.1	None	0.165334	22.32*	16.45
	~1997.10	At most 1	0.062545	5.88	5.88
	1997.11	None	0.242624	27.77**	17.23*
	~2002.12	At most 1	0.156287	10.54*	10.54*
Indonesia /Singapore	1990.1	None	0.091435	19.70	14.67
	~2002.12	At most 1	0.032372	5.03	5.03
	1990.1	None	0.133305	18.91	13.16
	~1997.10	At most 1	0.060583	5.75	5.75
	1997.11	None	0.135754	14.29	9.19
	~2002.12	At most 1	0.077773	5.10	5.10
Indonesia /Thailand	1990.1	None	0.145353	32.54**	24.03**
	~2002.12	At most 1	0.054149	8.52	8.52
	1990.1	None	0.108692	14.99	10.58
	~1997.10	At most 1	0.046742	4.40	4.40
	1997.11	None	0.262134	30.75**	18.84*
	~2002.12	At most 1	0.174732	11.91*	11.91*
Malaysia /Philippine	1990.1	None	0.084564	20.02*	13.34
	~2002.12	At most 1	0.043238	6.67	6.67
	1990.1	None	0.177309	24.69**	17.37*
	~1997.10	At most 1	0.078983	7.32	7.32
	1997.11	None	0.299549	25.37**	22.07**
	~2002.12	At most 1	0.051807	3.30	3.30

Note: *(**) denotes rejection of the hypothesis at the 5%(1%) level.

[Table 14] Bilateral Johansen Cointegration Test (4)

	Period	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
Malaysia /Singapore	1990.1	None	0.063425	12.13	9.89
	~2002.12	At most 1	0.014706	2.24	2.24
	1990.1	None	0.076863	13.58	7.28
	~1997.10	At most 1	0.066938	6.30	6.30
	1997.11	None	0.133699	13.33	8.90
	~2002.12	At most 1	0.068948	4.43	4.43
Malaysia /Thailand	1990.1	None	0.090053	23.61*	14.44
	~2002.12	At most 1	0.058206	9.18	9.18
	1990.1	None	0.152439	18.96	15.05
	~1997.10	At most 1	0.042086	3.91	3.91
	1997.11	None	0.222146	22.72*	15.57
	~2002.12	At most 1	0.108881	7.15	7.15
Philippine /Singapore	1990.1	None	0.084460	18.13	13.50
	~2002.12	At most 1	0.029824	4.63	4.63
	1990.1	None	0.097932	14.70	9.38
	~1997.10	At most 1	0.056747	5.32	5.32
	1997.11	None	0.123466	13.08	8.17
	~2002.12	At most 1	0.076127	4.91	4.91
Philippine /Thailand	1990.1	None	0.075706	17.82	12.04
	~2002.12	At most 1	0.037015	5.77	5.77
	1990.1	None	0.078506	12.67	7.44
	~1997.10	At most 1	0.055898	5.23	5.23
	1997.11	None	0.159416	19.59	10.77
	~2002.12	At most 1	0.132632	8.82	8.82
Singapore /Thailand	1990.1	None	0.061669	15.86	9.74
	~2002.12	At most 1	0.039241	6.12	6.12
	1990.1	None	0.062056	8.97	5.83
	~1997.10	At most 1	0.033943	3.14	3.14
	1997.11	None	0.198426	23.84*	13.71
	~2002.12	At most 1	0.150707	10.13*	10.13*

Note : *(**) denotes rejection of the hypothesis at the 5%(1%) level.

【Table 15】 Johansen Cointegration Test for Group I

	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
1990. 1~ 2002. 12	None	0.128244	26.43(34.91)	20.85(22.00)
	At most 1	0.025765	5.85(19.96)	3.92(15.67)
	At most 2	0.012798	1.93(9.24)	1.93(9.24)
1990. 1~ 1997. 10	None	0.184999	25.64(34.91)	18.62(22.00)
	At most 1	0.056052	7.03(19.96)	5.24(15.67)
	At most 2	0.019327	1.77(9.24)	1.77(9.24)
1997. 11~ 2002. 12	None	0.304320	33.57(34.91)	22.13(22.00)
	At most 1	0.122092	11.43(19.96)	7.94(15.67)
	At most 2	0.055654	3.49(9.24)	3.49(9.24)

Note: *(**) denotes rejection of the hypothesis at the 5%(1%) level.

Korea, Japan and China are given as Group I.

【Table 16】 Johansen Cointegration Test for Group II

	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
1990.1~ 2002.12	None	0.207182	81.18*(76.07)	35.06*(34.40)
	At most 1	0.137367	46.12(53.12)	22.31(28.14)
	At most 2	0.103376	23.81(34.91)	16.48(22.00)
	At most 3	0.031992	7.33(19.96)	4.91(15.67)
	At most 4	0.015921	2.42(9.24)	2.42(9.24)
1990.1~ 1997.10	None	0.306862	77.82*(76.07)	32.62(34.40)
	At most 1	0.196479	45.20(53.12)	19.47(28.14)
	At most 2	0.153283	25.73(34.91)	14.81(22.00)
	At most 3	0.088413	10.92(19.96)	8.24(15.67)
	At most 4	0.029706	2.68(9.24)	2.68(9.24)
1997.11~ 2002.12	None	0.632804	155.06**(76.07)	62.12**(34.40)
	At most 1	0.545982	92.94**(53.12)	48.96**(28.14)
	At most 2	0.428147	43.98*(34.91)	34.65**(22.00)
	At most 3	0.106618	9.34(19.96)	6.99(15.67)
	At most 4	0.037130	2.34(9.24)	2.34(9.24)

Note: *(**) denotes rejection of the hypothesis at the 5%(1%) level.

Indonesia, Malaysia, Philippine, Singapore, and Thailand are given as Group II.

[Table 17] Johansen Cointegration Test for Group III

	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
1990.1~ 2002.12	None	0.339537	203.80**(165.58)	62.22**(52.00)
	At most 1	0.224477	141.58*(131.70)	38.13(46.45)
	At most 2	0.195328	103.44*(102.14)	32.59(40.30)
	At most 3	0.180733	70.84(76.07)	29.90(34.40)
	At most 4	0.124743	40.94(53.12)	19.99(28.14)
	At most 5	0.067811	20.96(34.91)	10.53(22.00)
	At most 6	0.052427	10.42(19.96)	8.08(15.67)
	At most 7	0.015521	2.35(9.24)	2.35(9.24)
1990.1~ 1997.10	None	0.458733	191.08**(165.58)	55.86*(52.00)
	At most 1	0.338323	135.22*(131.70)	37.58(46.45)
	At most 2	0.275591	97.64(102.14)	29.34(40.30)
	At most 3	0.241145	68.30(76.07)	25.11(34.40)
	At most 4	0.172274	43.19(53.12)	17.20(28.14)
	At most 5	0.135003	25.98(34.91)	13.20(22.00)
	At most 6	0.102880	12.78(19.96)	9.88(15.67)
	At most 7	0.031398	2.90(9.24)	2.90(9.24)
1997.11~ 2002.12	None	0.805252	317.92**(165.58)	99.80**(52.00)
	At most 1	0.605466	218.11**(131.70)	56.73**(46.45)
	At most 2	0.558575	161.38**(102.14)	49.88**(40.30)
	At most 3	0.450042	111.50**(76.07)	36.47**(34.40)
	At most 4	0.433040	75.03**(53.12)	34.61**(28.14)
	At most 5	0.315164	40.41*(34.91)	23.09*(22.00)
	At most 6	0.182006	17.31(19.96)	12.25(15.67)
	At most 7	0.079675	5.06(9.24)	5.06(9.24)

Note : *(**) denotes rejection of the hypothesis at the 5%(1%) level.

China, Korea, Japan, Indonesia, Malaysia, Philippine, Singapore, and Thailand are in Group III.

synchronized with Japanese yen after the Asian crisis, and the Chinese yuan has been pegged to the U.S. dollar. The results suggest that there is some possibility of sustainable currency peg between Japan & Korea and the U.S. and China, whereas less feasibility is detected on the pegging regime between other East Asian countries.

In <Table 15>, the results of the cointegration relationship among Japan, Korea and China as a group I is reported. The test results

[Table 18] Johansen Cointegration Test for Group IV

	No. of CE(s)	Eigenvalue	Trace Statistic	Max-Eign Statistic
1990.1~ 2002.12	None	0.247783	117.26**(102.14)	42.71*(40.30)
	At most 1	0.157894	74.55(76.07)	25.77(34.40)
	At most 2	0.130768	48.77(53.12)	21.02(28.14)
	At most 3	0.115954	27.75(34.91)	18.49(22.00)
	At most 4	0.051426	9.26(19.96)	7.92(15.67)
	At most 5	0.008925	1.34(9.24)	1.34(9.24)
1990.1~ 1997.10	None	0.600164	158.69**(102.14)	81.59**(40.30)
	At most 1	0.249023	77.10*(76.07)	25.49(34.40)
	At most 2	0.229662	51.61(53.12)	23.22(28.14)
	At most 3	0.150073	28.39(34.91)	14.47(22.00)
	At most 4	0.104488	13.92(19.96)	9.82(15.67)
	At most 5	0.045015	4.10(9.24)	4.10(9.24)
1997.11~ 2002.12	None	0.718536	206.85**(102.14)	77.33**(40.30)
	At most 1	0.568700	129.51**(76.07)	51.30**(34.40)
	At most 2	0.508385	78.21**(53.12)	43.31**(28.14)
	At most 3	0.311765	34.90(34.91)	22.79*(22.00)
	At most 4	0.106173	12.11(19.96)	6.84(15.67)
	At most 5	0.082692	5.26(9.24)	5.26(9.24)

Note : *(**) denotes rejection of the hypothesis at the 5%(1%) level.

China, Indonesia, Malaysia, Philippine, Singapore, and Thailand are in Group IV.

indicate that there is no cointegrating vector. This points out that there exists no shared common trend of inflation in this group of countries. This implies that the pegged system might not be feasible among Korea, Japan and China.

<Table 16> shows the results of the cointegration relationship among some of ASEAN countries such as Indonesia, Malaysia, Philippine, Singapore and Thailand as a group II. The test results point out that there is three cointegrating vectors which indicates two common trends shared by all countries. This evidence shows that there is increased partial inflation convergence in this group of countries after the crisis. In <Table 17>, the group III of China, Korea,

Japan, Indonesia, Malaysia, Philippine, Singapore and Thailand is examined. The test results indicate that there are five cointegrating vectors which mean that there are two shared common trends. This implies the increased partial inflation convergence in this region after the crisis

In <Table 18>, the results of the cointegration relationship among China, Indonesia, Malaysia, Philippine, Singapore and Thailand as a group IV are given. The test results also indicate that there are two or three cointegrating vectors and two or three shared common trends in this region. The evidence also point out that there is partial inflation convergence in this group of countries after the crisis.

Summarizing the test results, even though the convergence has been increased since the crisis in East Asia, it is still weak. The results imply that the pegged regime such as common basket peg might not be sustainable and still not feasible among these countries.

IV. Conclusion

Monetary integration in East Asia has been argued until recently as increasing integration through trade in this region. Eichengreen and Bayoumi (1996) and other studies show that some conditions of OCA criteria are fulfilled in East Asia. Most of the shocks are symmetric and the size of the shock is almost same as in EU. Intra-regional trade has been increased until recently and shows large share of total trade in this region.

However, low financial integration and convergence in fundamentals have been criticized as a main drawback. In fact, volatile fundamentals in a country and divergent macroeconomic variable in the region could result unsustainable pegged regime.

In this paper, the convergence of economic fundamentals and inflation in East Asia are examined. The stationarity and cointegration

technique are used for two sub-periods, pre and after the crisis. Furthermore, inflation convergence of a group of countries is examined in order to identify the possible region or group for the pegged regime.

The results indicate that there exists non-stationary property and no cointegration relationship in most of the bilateral convergence. In the case of various groups' of Asian countries, some partial convergences have been detected. This means that the pegged system might not be sustainable in the sense of stable exchange rate in East Asia. It is shown here that pegging strategy to yen or the U.S. dollar might not be the right framework and feasible during the study period.

In the light of this test results, lack of cooperation of macroeconomic policy or coordination failure could be the main cause of unstable exchange rates in East Asia. The exchange regime choice in this region might not be the main problem. It could be suggested that before choosing flexible regime with inflation targeting or pegged exchange rate regime in East Asia, the cooperation in macroeconomic and exchange rate policy could increase the stability of East Asian monetary regime. However, this cooperation is not an easy task in East Asia. As Eichengreen and Bayoumi (1999) and Willett (2003) pointed out, East Asian countries have different historical and political backgrounds and divergent development stages from EU.

◆ *References* ◆

- Alessina, A. and R. J. Barro eds. (2001), *Currency Union*, Hoover Institution Press.
- Bayoumi, T., B. Eichengreen and P. Mauro (2000), "On Regional Monetary Arrangements for ASEAN," *Journal of the Japanese and International Economics*, vol. 14, pp. 121~148.
- Benassy-Quere, A. (1999), "Optimal Pegs for East Asian Currencies."

- Journal of the Japanese and International Economics*, vol. 13, pp. 44~60.
- Benassy-Quere, A. and B. Coure (2002), "The Survival of Intermediate Exchange Rate Regimes.
- Bergsten, C. F. and Y. C. Park (2002), "Toward Creating a Regional Monetary Arrangement in East Asia," ADB Institute Research Paper, no. 50, ADBI.
- Eichengreen, B. and T. Bayoumi (1999), "Is Asia an Optimum Currency Area? Can It Become One? Regional, Global and Historical Perspectives on Asian Monetary Relations," in S. Collignon *et al.* eds., *Exchange Rate Policies in Emerging Asian Countries*. Routledge, pp. 347~368.
- Ghosh, A. R., A. Gulde and H. C. Wolf (2002), *Exchange Rate Regimes, Choice and Consequences*, MIT Press.
- Goldstein, M. (2002), *Managed Floating Plus*, Policy Analysis in International Economics, no. 66, Institute for International Economics.
- Hafer, R. W. and A. M. Kutan (1992), "A Long-Run View of the German Dominance and the Degree of Policy Convergence in the EMS," *Economic Inquiry*, Western Economic Association International, vol. 32, pp. 684~695.
- Hennings, C. R. (2002), *East Asian Financial Cooperation*, Policy Analysis in International Economics, no. 68, Institute for International Economics.
- Kawai, M. and S. Takagi (2000), "Proposed Strategy for a Regional Exchange Rate Arrangement in Post-Crisis East Asia," World Bank Policy Research Working Papers, no. 2503.
- Koedijk, K. and C. J. M. Kool (1992), "Dominant Interest and Inflation Differentials within the EMS," *European Economic Review*, vol. 36, pp. 925~943.
- Park, Yung Chul (2002), "Prospects for Financial Integration and Exchange Rate Policy Cooperation in East Asia," ADB Institute Research Paper, no. 48, ADBI.
- Rana, P. B. (2002), "Monetary and Financial Cooperation in East Asia :

- The Chiang Mai Initiative and Beyond," ERD Working Paper Series, no. 6, ADB.
- Salvatore, D., J. W. Dean and T. D. Willett eds. (2002). *The Dollarization Debate*, Oxford University Press.
- Westbrook, J. R. (1998), "Monetary Integration, Inflation Convergence and Output Shocks in the European Monetary System," *Economic Inquiry*, Western Economic Association International, vol. 36, pp. 138~144.
- Whilborg, C. and T. D. Willett (1993), "The Instability of Half-Way Measure in the Transition to the Common Currency," in *EC 1992-Perspectives from Outside*, edited by Hubert Grubel, London, Macmillan.
- Willett, T. D. (2003), "Fear of Floating Needn't Imply Fixed Rates : An OCA Approach to the Operation of Stable Intermediate Currency Regimes," *Open Economies Review*, vol. 14, pp. 71~91.
- Williamson, J. (2000), *Exchange Rate Regimes for Emerging Markets : Reviving the Intermediate Option*, Policy Analysis in International Economics, no. 60, Institute for International Economics.
- Wyplosz, C. (2002), "Regional Exchange Rate Arrangements : Lessons from Europe for East Asia," ADB Seminar Paper.